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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,460	09/29/2003	Hiromu Sugiyama	0020-5182P	6659

2292 7590 03/15/2007  
BIRCH STEWART KOLASCH & BIRCH  
PO BOX 747  
FALLS CHURCH, VA 22040-0747

EXAMINER
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RUTHKOSKY, MARK

ART UNIT	PAPER NUMBER
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1745

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	03/15/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/15/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

## Office Action Summary

Application No.

10/671,460

Applicant(s)

SUGIYAMA ET AL.

Examiner

Mark Ruthkosky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/29/2006 has been entered.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al (EP 1,246,278) in view of Kawakami (US 5,641,591.)

The instant claims are to an electrode used for a non-aqueous electrode secondary battery, which comprises a current collector of a metallic material not to be alloyed with Li and a pattern of dots formed on the current collector, which is a metallic material able to be alloyed with Li, wherein the diameter of each dot is 1-500 micrometers, the shape of the dots is a cylindrical column or cone; the dots are regularly arranged and the occupancy rate of the dots on the current collector is 50 - 90%.

The phrases “not to be” and “able to be” are intended use limitations that give no structure to the current collector. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Ikeda et al (EP 1,246,278) teaches an electrode used for a non-aqueous electrolyte secondary battery, which comprises a current collector of a metallic material (claim 35), which is not alloyed with Li and dots of a metallic material which are able to be alloyed with Li and formed in a form of pattern on the current collector (claims 1, 6, 7, 32-35 and 41, figures 10-11.) Materials of group 14 are noted in claim 7. The materials are inherently porous as they are the same materials used in the instant application. Columnar portions are noted on the current collector with spaces provided around the column (p. 81.) The shape of the material is convex (see figure 10c.) The diameter of the dots is in the range of 1-500 micrometers (figs. 11-12). Although not all dots are taught to be in the range of 1-500nm, it would be obvious to one of ordinary skill in the art to include dots in this range based on the overall thickness of the electrodes and the teaching of the sizes of the columns taught in figures 11-12. The thickness of the film is about 10 microns (p. 78-82.) Crystal grain sizes on the order of 10 microns are noted in Table 2. Means spacing of local peaks being greater than 5 microns are noted in Table 3. The surface roughness is on the order of 0.05-5 micron (p. 24.) Mixed layer alloys of Cu and group Iv elements are taught in claims 19-25 and p. 159-162. The dots are taught to be of an amorphous material (claims 9-15.)

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The reference does not teach that the occupancy rate of the dots on the current collector is 50 - 90%. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an occupancy rate in the range of 50-90% as the material of the dots is used to incorporate lithium in an anode, while open space is taught on the electrode surface for the expansion and contraction of the alloyed material. Lithium ions are intercalated into the material that forms the dots. It would be obvious to add the maximum amount of lithium occluding material on the electrode to increase the capacity of the battery. One skilled in the art would utilize as much lithium as possible in the battery, while allowing for opened spaces as taught in Ikeda to reduce stress on the electrode by providing space on the electrode surface (see paragraphs 5-12 and 19-24.) The open spaces help to prevent for the loss of active material during charging and discharging of the battery. As the art recognizes the use of the lithium intercalating material and the advantage of open spaces on the electrode, adjusting the occupancy rate would be obvious to the skilled artisan in order to balance the amount of alloy material with the amount of space that is needed to prevent stress on the electrode (p. 19-26.) Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation, *In re Aller, Lacey and Hall*, 105 U.S.P.Q. 233, 235. The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

Further, the Ikeda et al (EP 1,246,278) reference does not teach the shape of the dots is a cylindrical column or cone, or that the dots are regularly arranged. Kawakami (US 5,641,591), however, teaches an electrode used for a non-aqueous electrode secondary battery, which comprises a current collector of a metallic material and a pattern of dots formed on the current

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collector, which is a metallic material, wherein the dots are regularly arranged (see figures 1-4 and the claims.) The reference does not teach that the shape of the dots is a cylindrical column or cone. The dots are in the shape of a column (see col. 7, lines 28-36 and the figures.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to prepare the columns in a cylindrical shape as the cylindrical columns would perform the same function taught in the prior art references of holding active material in the current collector and allowing for the transfer of electrons from the active material through the battery. The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

#### ***Response to Arguments***

Applicant's arguments filed 12/6/2006 have been fully considered but they are not persuasive. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

#### ***Examiner Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free.)

Mark Ruthkosky

Primary Patent Examiner

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A handwritten signature in black ink, appearing to read 'Mark Ruthkosky', written in a cursive style.

3/2/07